

Geometry Date \_\_\_\_\_ 1.1 Notes: Patterns & Inductive Reasoning  
(pp 3-6)

**Warm-up Problems:** Evaluate each expression for the indicated value of  $x$ .

A.  $x^2$ , for  $x = 0.5, 1, \& -1$ .

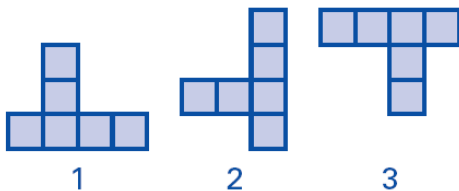
B.  $(x + 1)(x - 1)$  for  $x = 1, 2, \& 3$ .

C.  $\frac{(x+1)}{2}$  for  $x = 1, 2, \& 3$

D.  $\sqrt{x}$  for  $x = \frac{1}{4}, 4, \& 9$

**Examples**

1. Sketch the next figure:



Predict the next number:

2. 17, 15, 12, 8, ...

3. 48, 16,  $\frac{16}{3}$ ,  $\frac{16}{9}$  ...

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**Inductive Reasoning:**

**Steps to Inductive Reasoning**

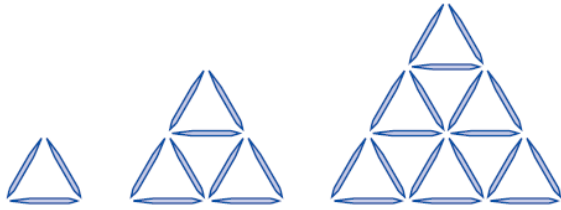
**4. Example:** The product of any two consecutive positive integers is \_\_\_\_.

**Counterexample:**

**5. Example:** Show the conjecture is false by finding a counterexample: *The difference of two positive numbers is always positive.*



**Guided Practice: Use the pattern**



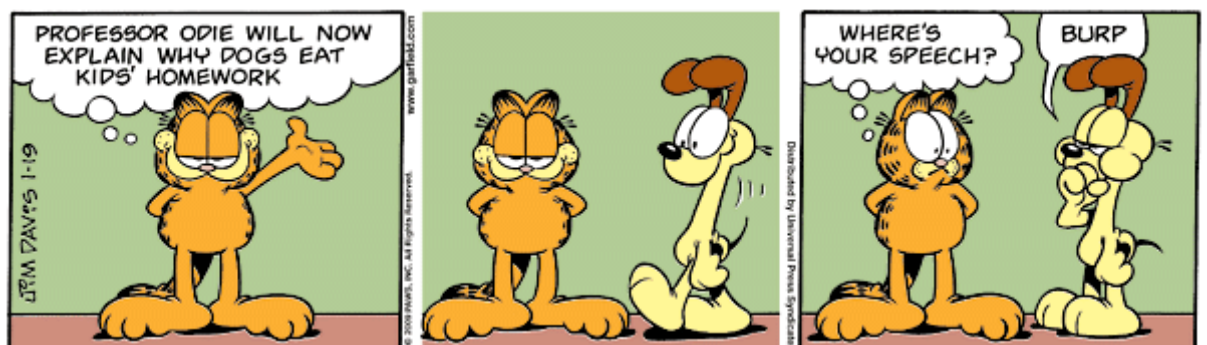
6. Sketch the next figure in the pattern.

7. Write the first four terms of a sequence of numbers that gives the number of toothpicks used to form each figure. Predict the next number.

8. The number of toothpicks needed to make the  $n$ th figure is  $3 + 3n$ . Show that this conjecture is false by finding a counterexample.

**Goldbach's conjecture:** Every even number greater than 2 can be written as the sum of two primes.

9. **Example:** Show that Goldbach's conjecture is true for  $n = 44$ .



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10. **Guided Practice:** Show that Goldbach's conjecture is true for  $n = 42$ .

11. **Example:** An observer notices that during the evening commute, buses arrive at a particular bus stop at the same times each day. Use inductive reasoning and the information below to make a conjecture about how often a bus comes to this stop during rush hour.

Buses stop every day at 5:15 P.M., 5:38 P.M., 6:01 P.M., and 6:24 P.M.

**Guided Practice**

12. Four adults attended a movie for \$28. Three adults attended the same movie for \$21 and 6 adults attended the movie for \$42. Use inductive reasoning to make a conjecture about the price of each adult movie ticket.

13. Explain what conjecture is.

14. How can you prove that a conjecture is false?

